Development of a Real-Time Web-Based Dashboard for Interstate Performance Monitoring

by Maggie McNamara and Darcy Bullock

PURDUE UNIVERSITY

Overview

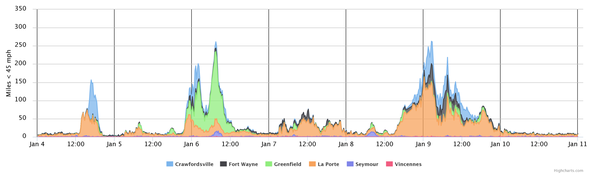
Real-time performance measurement of interstate congestion is critical for successful traffic operations management. Monitoring interstate speeds in real time provides the basis for operations engineers to assess interstate system performance at a high level. Crowdsourced probe vehicle data are real-time speeds on roadways collected from cell phones, GPS devices, and vehicle telematics that can be turned into useful performance measures. This project involved the development of a real-time dashboard to display graphs to characterize the congestion history of interstate roadways using the number of miles operating below 45 mph. The playback feature allows for review of conditions during an event such as a road closure or ice storm.

Theory

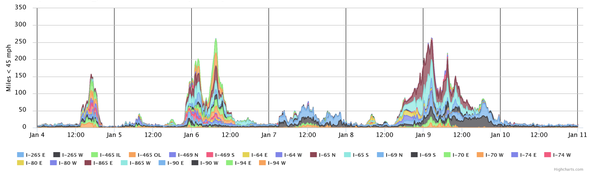
The mobility measure utilized is miles of road operating under a certain speed, 45 mph by default. This gives a quick snapshot of mobility on interstates across a state or district. The data come from crowdsourced probe vehicle data on predefined road segments that are about one mile in length. The raw data are obtained each minute and aggregated every fifteen minutes using the median speed.

The website is comprised of five graphs: three area graphs that show congestion history and two column graphs that give a snapshot of current conditions. Users may specify which roads and districts to view, as well as how much time to cover in the graph, whether to display total miles or percentage of road length, and the speed threshold for congestion. The graphs below are from the week of Jan. 4-10 2015.

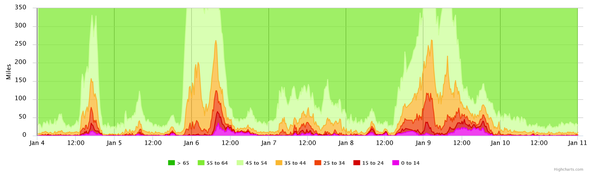
Miles operating below 45 mph by district:



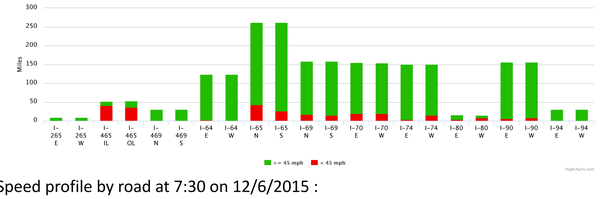
Miles operating below 45 mph by road:



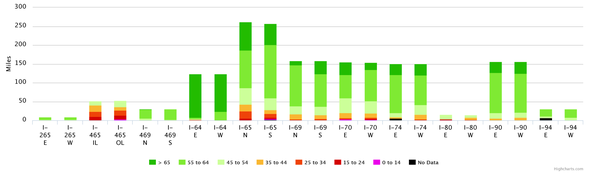
Speed profile for all interstates:

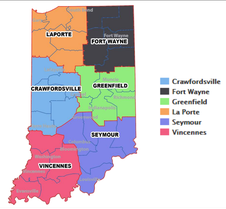


Miles operating above and below 45 mph by road at 7:30 on 12/6/2015:



Speed profile by road at 7:30 on 12/6/2015 :

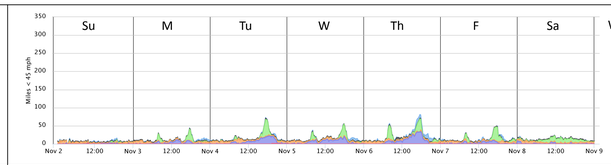




Winter Mobility Interstate Performance

November 2014

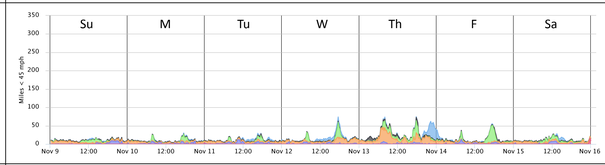
Nov 2-8



Weekly total mile-hours of speed <45 mph:

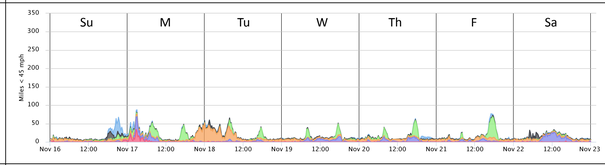
Crawfordsville	199
Fort Wayne	307
Greenfield	627
La Porte	686
Seymour	639
Vincennes	11
Total	**2469**

Nov 9-15



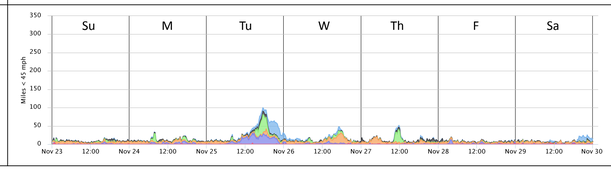
Crawfordsville	320
Fort Wayne	376
Greenfield	519
La Porte	989
Seymour	278
Vincennes	14
Total	**2496**

Nov 16-22



Crawfordsville	220
Fort Wayne	423
Greenfield	597
La Porte	1073
Seymour	497
Vincennes	87
Total	**2897**

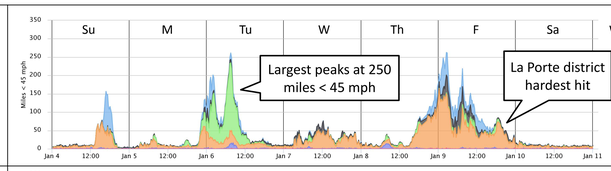
Nov 23-29



Crawfordsville	385
Fort Wayne	383
Greenfield	344
La Porte	868
Seymour	396
Vincennes	22
Total	**2398**

January 2015

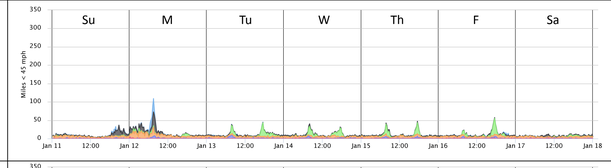
Jan 4-10



Weekly total mile-hours of speed <45 mph:

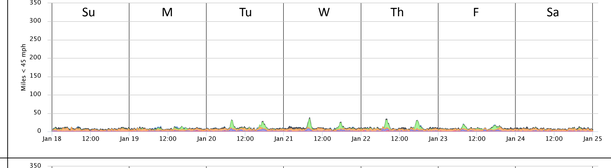
Crawfordsville	1155
Fort Wayne	922
Greenfield	1287
La Porte	3669
Seymour	175
Vincennes	8
Total	**7216**

Jan 11-17



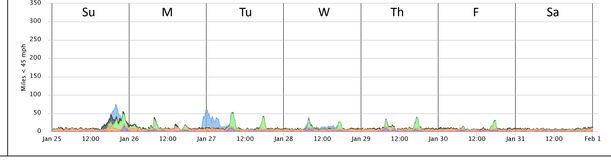
Crawfordsville	88
Fort Wayne	495
Greenfield	371
La Porte	873
Seymour	145
Vincennes	14
Total	**1986**

Jan 18-24



Crawfordsville	32
Fort Wayne	317
Greenfield	215
La Porte	745
Seymour	161
Vincennes	12
Total	**1482**

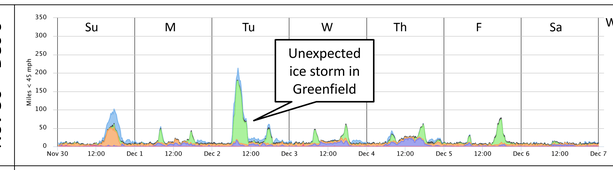
Jan 25-31



Crawfordsville	329
Fort Wayne	368
Greenfield	396
La Porte	786
Seymour	182
Vincennes	13
Total	**2074**

December 2014

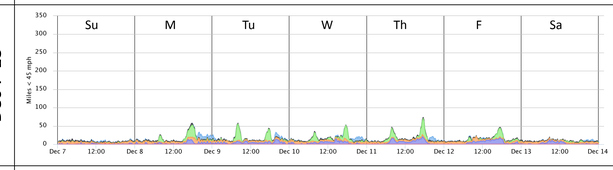
Nov 30 – Dec 6



Weekly total mile-hours of speed <45 mph:

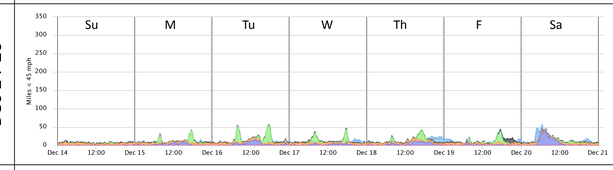
Crawfordsville	548
Fort Wayne	335
Greenfield	996
La Porte	902
Seymour	514
Vincennes	22
Total	**3317**

Dec 7-13



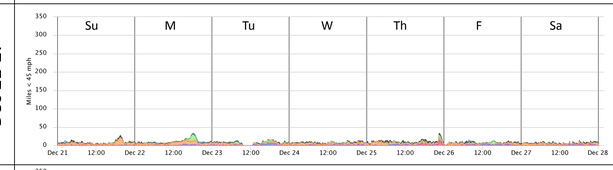
Crawfordsville	218
Fort Wayne	339
Greenfield	550
La Porte	776
Seymour	557
Vincennes	7
Total	**2447**

Dec 14-20



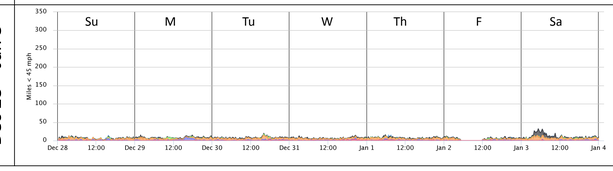
Crawfordsville	258
Fort Wayne	338
Greenfield	494
La Porte	732
Seymour	482
Vincennes	9
Total	**2313**

Dec 21-27



Crawfordsville	53
Fort Wayne	296
Greenfield	118
La Porte	763
Seymour	160
Vincennes	41
Total	**1430**

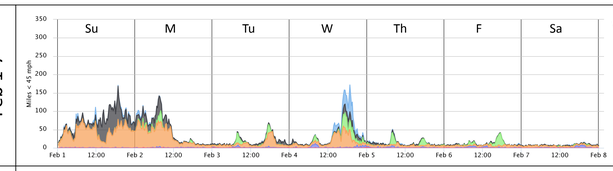
Dec 28 – Jan 3



Crawfordsville	23
Fort Wayne	336
Greenfield	64
La Porte	695
Seymour	137
Vincennes	35
Total	**1290**

February 2015

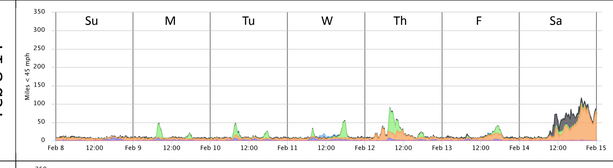
Feb 1-7



Weekly total mile-hours of speed <45 mph:

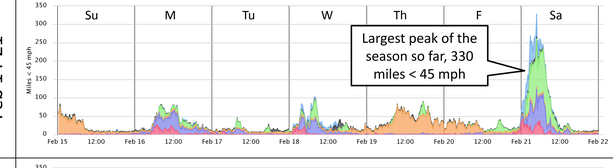
Crawfordsville	348
Fort Wayne	1378
Greenfield	487
La Porte	2841
Seymour	188
Vincennes	12
Total	**5254**

Feb 8-14



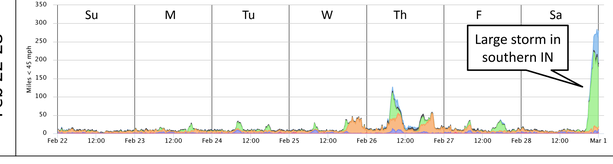
Crawfordsville	54
Fort Wayne	596
Greenfield	456
La Porte	1625
Seymour	184
Vincennes	7
Total	**2922**

Feb 14-21



Crawfordsville	441
Fort Wayne	431
Greenfield	1375
La Porte	2076
Seymour	1249
Vincennes	397
Total	**5969**

Feb 22-28



Crawfordsville	242
Fort Wayne	341
Greenfield	908
La Porte	1275
Seymour	237
Vincennes	19
Total	**3022**